BRIEF NOTE

RELATIVE POPULATION DENSITIES AND ADRENAL GLAND WEIGHTS AS RELATED TO ISLAND POPULATIONS OF *PEROMYSCUS MANICULATUS*.[1]

One of the characteristics in which island and mainland populations may differ is density; island populations often manifest higher densities than those on the mainland (MacArthur and Wilson, 1967). The size of the island is critical to the expression of this phenomenon. Populations on the mainland may become sufficiently isolated so that they assume at least some island qualities (Culver, 1970). Similarly, man-made barriers can effectively isolate areas which can then essentially function as islands. Krebs, *et al* (1969) found in a field experiment conducted on *Microtus* that enclosed populations had up to three times the population density of unenclosed populations (despite the density dependent effects on fecundity found in most other populations. Higher population levels in these rodents were attributed to the inability of juveniles to emigrate.

In the present report, an attempt was made to establish a correlation between relative population densities, adrenal gland weights, and island size. The data supporting this relationship were obtained concurrently with an investigation into the electrophoretic enzyme variation found in populations of the deer mouse, *Peromyscus maniculatus* (Browne, 1976). Three of the populations were from islands located linearly within the Bass archipelago (an island complex which spans across western Lake Erie). Two populations were from proximal mainland areas and one from deep inland. Sherman small mammal live-traps were used to collect 116 individuals. The traps were set approximately 6 m apart in a grid pattern and 6 localities were sampled with trap dates and number of traps set as follows: (1) 3.7 km W. of Kingsville, Ontario, 7/8/73, 70; (2) West shore, North Bass Island, 7/7/73, 71; (3) North shore, Middle Bass Island, 6/19/73, 28; (4) West shore, South Bass Island, 6/5/73, 45; (5) North shore, Catawba peninsula, Ohio, 5/5/73, 116; (6) 6.8 km South of Dayton, Ohio 5/29/73, 188. Per cent capture rates were recorded as the ratio of *P. maniculatus* captured to the number of traps set $\times$ 100.

No significant differences between male/female or juvenile/adult ratios were found between sites when examined by a Chi-Square test. Females constituted 58% and juveniles (distinguished by grey coat pelage and smaller size) 11% of the population, when the data from all sites were averaged. Juveniles were used in estimating relative density but were not used for adrenal gland weight calculations. Collected mice were transported live in plastic cages (28 x 15 x 13 cm) to the Biology Department of the University of Dayton where they were provided a diet of Purina Laboratory Chow, mixed seeds, and water. Sacrifice took place within 24 hours of capture. Adrenals were removed, damp-dried on absorbant paper, and immediately weighed on a Mettler balance.

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TABLE 1

Area size, per cent trap capture, adrenal weight for populations of Peromyscus maniculatus.

Site	Approximate Size (hectares)	Trap Capture (per cent)	Pairs of Adrenal Glands Weighed	Adrenal Weight (mg)
Inland Ohio	10^6	11	19	5.4± .31*
Ontario Pen.	10^5	26	18	5.0± .34
Catawba Pen.	10^4	20	18	6.1± .39
South Bass Is.	614	26	10	7.2± .81
Middle Bass Is.	308	54	15	6.5± .36
North Bass Is.	304	58	36	6.9± .25
Combined Island Populations		42	61	6.9± .35
Combined Non-Island Populations		15	55	5.4± .37

*Mean ± standard error of the mean.

A summary of adrenal weights is presented in table 1 for each of the six populations along with area size and per cent capture data. A negative correlation ($r = -0.802$) between the log of island size and per cent trap capture was found. North Bass Island, the smallest island, showed the greatest capture rate (58%), while the inland Ohio site exhibited the lowest (11%). There was also a negative correlation ($r = -0.879$) between adrenal gland weight and the log of island size. In all cases, island populations exhibited higher adrenal gland weight values than mainland populations. Decreasing island size seems to lead to increasing population density accompanied by an increase in adrenal gland weight.—ROBERT A. BROWNE, *Biology Department, University of Dayton, Ohio 45469. Present address, Biology Department, Syracuse University, Syracuse, N.Y. 13210.*

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